Question 1.8:

What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose?

- Interrupt Purpose: Alerts CPU to handle events requiring immediate attention.
- Trap vs. Interrupt: Trap is software-generated; interrupt is hardware-triggered.
- User-Generated Traps: Yes, for system calls or debugging.

Question 1.9:

Direct memory access is used for high-speed I/O devices in order to avoid increasing the CPU's execution load.

- (a) CPU coordinates via device driver and commands.
- (b) CPU detects completion through interrupt from DMA controller.
- (c) DMA can cause delays in memory access for other programs.

Question 2.2:

Describe three general methods for passing parameters to the operating system.

- Three Parameter Passing Methods: Registers, memory (address pointers), stack.

Question 2.8:

Why is the separation of mechanism and policy desirable?

- Separation Desirability: Allows flexible policy changes without altering mechanisms.

Question 2.9:

Identify a scenario in which it is unclear how to layer two system components that require tight coupling of their functionalities.

- Layering Difficulty Example: Tight coupling between memory management and process scheduling.

Question 2.10:

What is the main advantage of the microkernel approach to system design? How do user programs and system services interact in a microkernel architecture? What are the disadvantages of using the microkernel approach?

- Microkernel Advantage: Minimal OS core, better security and reliability.
- Interaction in Microkernel: User programs interact via message-passing with system services.
- Disadvantage: Slower performance due to increased communication overhead.

Question 2.12:

How are iOS and Android similar? How are they different?

- iOS vs. Android Similarities: Both mobile OS platforms with app stores and touchscreen interfaces.
- Differences: iOS is closed-source and tightly controlled; Android is open-source and customizable.